REMARKS

Claims 1-48, are pending in the application. Upon entry of the afore-mentioned election of Group I, Claims 1-29 will be pending and under active consideration, with Claim 1, 23, and 29 being independent.

AUTHORIZATION

Applicants believe there is no additional fee due in connection with this filing. However, to the extent required, the Commissioner is hereby authorized to charge any fees due in connection with this filing to Deposit Account 50-1710 or credit any overpayment to same.

Respectfully submitted,

Serge Sira

Serge Sira
Registration No. 39,445
Gilberto M. Villacorta, Ph.D.
Registration No. 34,038

Patent Administrator
KATTEN MUCHIN ZAVIS ROSENMAN
525 West Monroe Street, Suite 1600
Chicago, Illinois 60661-3693
Facsimile: (312) 902-1061

Dated: January 13, 2003

EXHIBIT A

CLAIMS WHICH WILL BE PENDING UPON ENTRY OF THE PRESENT ELECTION FILED JANUARY 13, 2003 U.S. PATENT APPLICATION NO. 09/586,981

1. A bioreactor, comprising:

(a) a housing having an inner side comprising: a gas introduction means integral to the housing; and a gas expiration means integral to the housing;

(b) an array of a plurality of modules of hollow fibers, residing within the housing, each module comprising:

(i) a plurality of coaxial hollow fibers, each having an inner side and an outer side, including an innermost hollow fiber and an outermost hollow fiber;

(ii) a plurality of compartments, comprising: a first compartment defined by the inner side of the innermost hollow fiber; and

(iii) at least one additional compartment defined by a respective annular space between adjacent fibers of the plurality of coaxial hollow fibers; and

(c) an outermost compartment defined by a space within the inner side of the housing which is not occupied by the plurality of modules.

2. The bioreactor of claim 1, where the hollow fibers are semipermeable.

3. The bioreactor of claim 2, where the hollow fibers comprise a material selected from the group consisting of polysulfone, polypropylene, nylon, polyester, polytetrafluoroethylene, cellulose acetate, and mixed esters of cellulose.

4. The bioreactor of claim 1, where the first compartment, the at least one additional compartment and the outermost compartment each further comprise at least one inlet port and at least one outlet port.

5. The bioreactor of claim 1, where the bioreactor further comprises at least 10^9 cells.

6. The bioreactor of claim 5, where the cells are liver cells.

7. The bioreactor of claim 6, where the liver cells are selected from the group consisting of porcine liver cells and human liver cells.

8. The bioreactor of claim 4, where the housing further comprises at least one inlet manifold and at least one outlet manifold for the first compartment and at least one inlet manifold and at least one outlet manifold for each additional compartment.

9. The bioreactor of claim 8, where at least one manifold further comprises a flow distributor.

10. The bioreactor of claim 9, where at least one compartment further comprises an extracellular matrix.

11. The bioreactor of claim 1, where at least one annular space is about 0.2 millimeters to about 0.8 millimeters.

12. The bioreactor of claim 1, where the bioreactor is sterilized by a means selected from the group consisting of autoclaving, ethylene oxide and gamma radiation.

13. The bioreactor of claim 1, wherein the innermost hollow fiber has a length of about 2 centimeters to about 50 centimeters.

14. The bioreactor of claim 8, where the housing has a first end and a second end, and where each inlet port and each exit port are at the first end of the housing.

15. The bioreactor of claim 8, further comprising:

microfibers substantially parallel to the modules of hollow fibers.

16. The bioreactor of claim 15, where the microfibers further comprise at least one aeration inlet port and at least one aeration outlet port.

17. The bioreactor of claim 1, where at least one coaxial hollow fiber is saturated with perfluorocarbon.

18. The bioreactor of claim 1, where at least one coaxial hollow fiber has a pore size less than 1×10^{-6} m.

19. The bioreactor of claim 1, where at least one coaxial hollow fiber has a pore size less than 0.1×10^{-6} m.

20. The bioreactor of claim 1, where at least one coaxial hollow fiber has a pore size less than 0.05×10^{-6} m.

21. The bioreactor of claim 1, where at least one compartment further comprises cells mixed with an extracellular matrix.

22. A method of supplying cell biosynthesis products to a patient in need thereof, comprising: pumping intravenous feeding solution through a compartment of the bioreactor of claim 5; collecting the output; and intravenously feeding the output to the patient.

23. A serially-linked bioreactor, comprising a plurality of bioreactor subunits, each bioreactor subunit comprising:

(a) a housing having an inner side comprising: a gas introduction means integral to the housing; and a gas expiration means integral to the housing;

(b) an array of a plurality of modules of hollow fibers, residing within the housing, each module comprising:

(i) a plurality of coaxial hollow fibers, each having an inner side and an outer side, including an innermost hollow fiber and an outermost hollow fiber;

(ii) a plurality of compartments, comprising: a first compartment defined by the inner side of the innermost hollow fiber; and at least one additional compartment defined by a respective annular space between adjacent fibers of the plurality of coaxial hollow fibers; and

(c) an outermost compartment defined by a space within the inner side of the housing which is not occupied by the plurality of modules; and

(d) at least one compartment of one bioreactor subunit linked serially to at least one compartment of at least one other bioreactor subunit.

24. The bioreactor of claim 23, where each bioreactor subunit further comprises at least 10^9 cells.

25. The bioreactor of claim 24, where the cells are liver cells.

26. The bioreactor of claim 25 where the cells are selected from the group consisting of human liver cells and porcine liver cells.

27. The bioreactor of claim 24, where at least one compartment of each bioreactor subunit further comprises an extracellular matrix.

28. A method of treating a patient in need thereof comprising:

(a) introducing plasma of a patient into a bioreactor subunit of the serially linked bioreactor of claim 23,

(b) forcing at least a portion of the plasma to flow radially through a cell compartment of the bioreactor subunit to form a biotransformed effluent;

(c) introducing the biotransformed effluent into a second bioreactor subunit of the bioreactor of claim 23;

(d) forcing at least a portion of the biotransformed effluent to flow radially through a cell compartment of the second bioreactor subunit to form supplemented plasma; and

(e) returning the supplemented plasma to the patient's circulatory system.

29. A multi-coaxial hollow fiber bioreactor, comprising:

(a) a housing comprising an inner side; and

(b) a module of hollow fibers, comprising: at least three coaxial semipermeable hollow fibers, including an innermost fiber having an inner side, the inner side defining a first compartment which comprises at least one innermost inlet port and at least one innermost outlet port; a plurality of compartments, each compartment defined by a respective annular space between adjacent fibers of the at least three hollow fibers, including at least one outer inlet port and at least one outer outlet port,

where each compartment comprises a flow communication means between the respective annular space, the respective outer inlet port and the respective outer outlet port and where one of the annular spaces contains eucaryotic cells; and

(c) an outermost compartment defined by a space between the outer side of the outermost fiber of said at least three hollow fibers, and the inner side of the housing, and comprising at least one outermost inlet port, and at least one outermost outlet port;

the housing comprising at least one inlet manifold and at least one outlet manifold for each of the compartments; where at least one of the compartments contains eucaryotic cells.